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AGRICULTURAL MEMORANDUM NO 338
DRY SPELLS IN THE AREA OF THE LOWER TEES AND WEAR
B INGHAM

This memorandum comes as a result of an enquiry from a farmer near Darlington asking about dry periods and humidity in his area. In effect, he hoped to obtain data indicating periods in the year most likely to be dry, or, if not dry, when the relative humidity was low. The nearest site for which temperature and humidity data were available was Middleton St George but taped data were available for seven years only. Whilst awaiting this data an analysis was made of rainfall data for Durham as this was already held.

Part of this analysis forms the lower section of the attached diagram which shows the number of occasions in 54 years that each day was a member of a dry spell of 3 days or more or 5 days or more.

A similar procedure was adopted for the Middleton St George data but because of the short period a consolidated diagram could not be justified; however, by including dry spells for Durham it can be seen (as might be expected) that there are only minor differences across the area and therefore there is likely to be little error in using the Durham diagram for general planning purposes.

In addition to spells of days when there was no measurable rain, spells were noted which lasted at least 3 days and in which there was no measurable rain by day (09-21) and the night time rain was less than 0.6mm. These criteria were adopted, perhaps somewhat arbitrarily, because even small amounts of rain in the daytime period probably implied the existence of showers in the area, and showers are notorious for their effect on rainfall amounts over short distances, whilst the upper limit of 0.5mm for the night time rain seemed a reasonable one for all but the wettest of "haars" or "sea-frets". In addition the criteria for the daytime also effectively excluded some occasions when the Haar or associated stratus persisted all day and gave drizzle at times. These criteria may be a little too strict because they do not seem to have allowed any great increase in the number of periods which can be called dry.

For each of the days in each of the periods delineated above a figure for the daytime relative humidity was obtained from the averages of the temperature and dew point for the hours 09, 12, 15 and 18 GMT, and in addition are shown spells of 3 days or more when the relative humidity was 65% or below, whatever the rainfall in the period.

These values are shown at the top of the diagram for each year, and it should be noted that the lines joining the points should not be taken to indicate continuity because the intervening night time values are not included, but it was felt that it was better to join the points rather than leave a scattering of dots or crosses over the diagrams. The Climatological Atlas of the British Isles shows for 1300 GMT that the average relative humidity in the area is between 65 and 70% in May, June and July, and between 70 and 75% in August and September. Rather than pick separate values for different months one value, 65%, was adopted because in the dry spells search was being made for occasions when the relative humidity was well below average not only at one hour but over a period of time. Inclusion of values for 0900 GMT when the relative humidity is usually much higher than at the other

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hours ensured that when the resulting value of relative humidity was 65% or less the day was an occasion of very dry air with early afternoon relative humidity well below average.

From the diagrams three sets of circumstances are apparent, Viz dry spells with dry air, dry spells with moist air and periods with dry air but with rain at times. It is possible to visualise series of events leading from one set of circumstances to another. One such series might be a period of westerlies or northwesterlies giving showers but with very dry air between the showers, followed by the building of a ridge or anticyclone giving dry weather and dry air and then the high pressure moving to the North Sea giving surface winds off the sea especially in the afternoon. A subjective count of the dry spells divided into dry, moist and mixed air gives figures of 26, 23 and 15 respectively. This implies that in this area even when a dry spell does occur the chances of good drying conditions throughout are at least about 3 to 2 against. It would be interesting to know how this compares with areas further south, in Norfolk, Essex or Cambridge for example.

In general the pattern of highest and lowest frequencies of dry spells is very much the same as the accepted pattern over the contry namely a high frequency in late spring and a low frequency in mid-August. What does merit a little extra emphasis is high frequency of occurrence of 5 day dry spells in the ten day period from 26 May to 4 June. This is almost the same period as that quoted by Plant in the Climate of Edinburgh - Climatological Memorandum 54A - as having the highest frequency of dry days. It also suggests that the high sunshine and low rainfall figures for the week ending 3 June shown for the Agro Met stations in the Yorkshire-Lancashire region are not just features of the past 18 to 20 years but form part of the general pattern in the North over the last half century or so. A parallel coincidence of low sunshine and high rainfall can also be detected in the mid-August period.

Any comments or suggestions on this paper should be sent to the author.

Meteorological Office
NAAS, Lawnswood, Leeds
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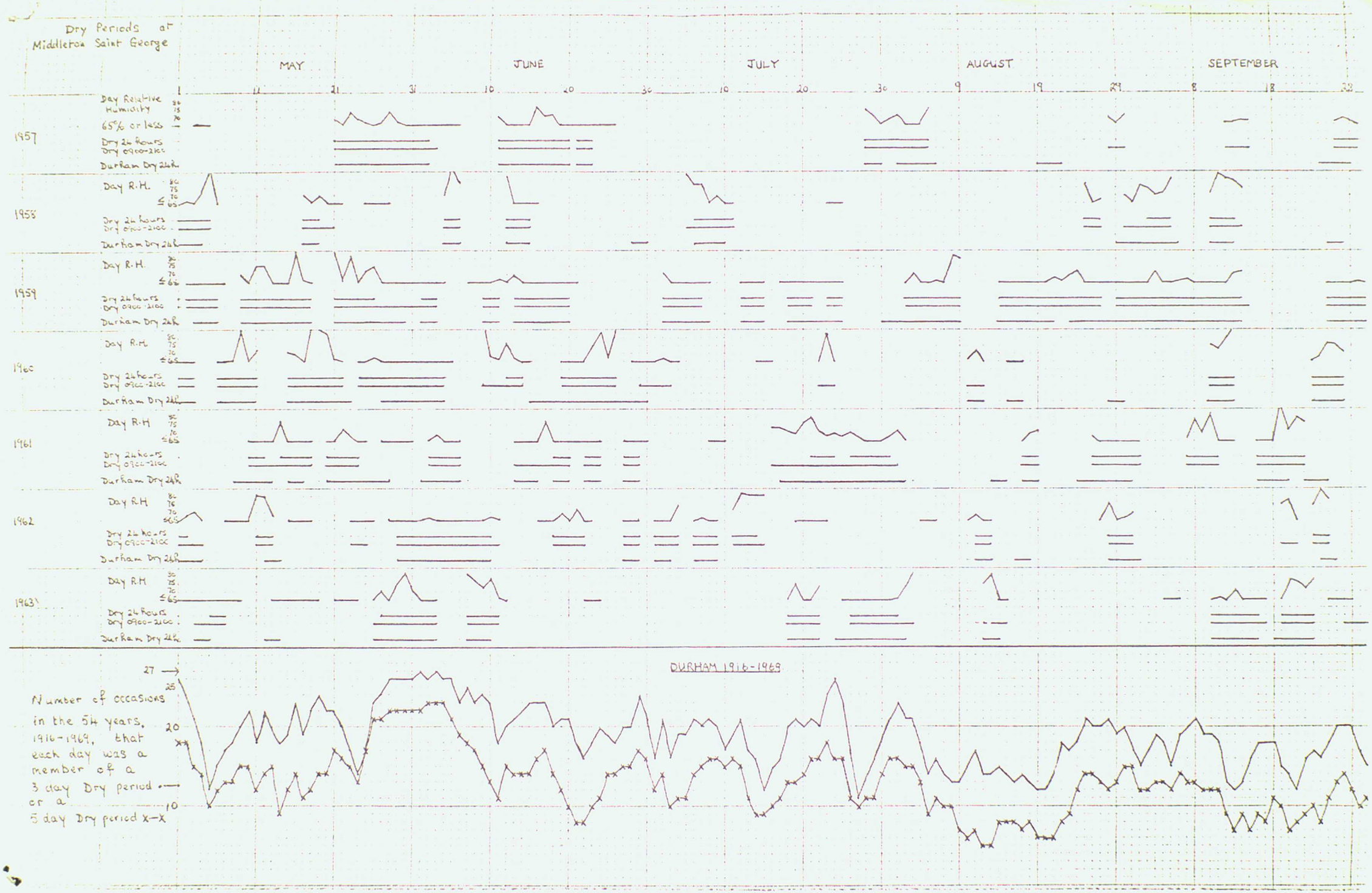
Dry Periods at Middleton Saint George



DURHAM 1916-1969

27
25
20
10
Number of occasions in the 54 years, 1916-1969, that each day was a member of a 3 day Dry period or a 5 day Dry period x-x